AMENDMENTS TO THE CLAIMS

This listing of claims replaces all prior versions and listings of claims in the application:

Listing of Claims:

1. (Currently Amended) A method for defining a boundary separating a first region and a second region of a digital image, the digital image including one or more color arrangements characteristic of a first visual texture of the first region and one or more color arrangements characteristic of a second visual texture of the second region, the method comprising:

receiving a user input providing a training set of pixels exhibiting sample color arrangements associated with the first and second visual textures;

training a learning machine to classify learning machine input sets based upon the training set, each learning machine input set including a pixel of interest and neighboring pixels and being derived from pixels in the digital image;

determining ~~using a~~ using the trained learning machine~~, based on one or more of the color arrangements,~~ which pixels of the digital image satisfy criteria for classification as being associated with the first region or second region, by inputting learning machine input sets and outputting an indication of a region to which each of the pixels of interest belong;

~~determining using a learning machine, based on one or more of the color arrangements, which pixels of the image satisfy criteria for classification as associated with the second region;~~

identifying pixels of the digital image that are determined not to satisfy the criteria for classification as being associated either with the first region or the second region; and

decontaminating the identified pixels to define ~~a boundary~~ the boundary between the first and second regions by separating pixels of the digital image into pixels associated with the first region, the second region, or the boundary.

2. to 3. (Cancelled)

4. (Currently Amended) The method of ~~claim 2, wherein:~~ claim 1, wherein the learning machine is a support vector machine.

5. (Currently Amended) The method of ~~claim 2, wherein:~~ claim 1, wherein the learning machine is a neural network.

6. (Currently Amended) The method of ~~claim 2, wherein:~~ claim 1, wherein ~~the learning machine is configured to provide an output classifying the pixel being considered, the output indicating~~ the indication represents a probability of the pixel of interest being associated with the first region and a probability of the pixel of interest being associated with the second region.

7. (Currently Amended) The method of claim 6, ~~wherein: the output~~ wherein the indication is a floating point number between a lower number and an upper number, the lower number indicating a one-hundred percent probability of the pixel of interest being associated with the second region, and the upper number indicating a one-hundred percent probability of the pixel of interest being associated with the first region.

8. (Previously Presented) The method of claim 7, wherein:
the lower number is –1 and the upper number is 1.

9. (Currently Amended) The method of claim 7, further comprising:
converting the floating point number to an integer between a first integer and a second integer, the first integer indicating a one-hundred percent probability of the pixel of interest being associated with the second region, and the second integer indicating a one-hundred percent probability of the pixel of interest being associated with the first region.

10. (Previously Presented) The method of claim 9, wherein:
the first integer is 0 and the second integer is 255.

11. (Previously Presented) The method of claim 9, wherein:
the criteria for classification as associated with the first region includes having an integer that exceeds a first threshold; and

the criteria for classification as associated with the second region includes having an integer that is less than a second threshold.

12. (Previously Presented) The method of claim 11, wherein:
the first threshold is 170 and the second threshold is 85.

13. to 14. (Cancelled)

15. (Currently Amended) The method of claim 1, wherein ~~claim 14, wherein:~~ the training set of pixels ~~selected~~ includes pixels located within a particular range of the boundary.

16. (Previously Presented) The method of claim 15, wherein:
the particular range is 20 pixels from either side of the boundary.

17. (Currently Amended) The method of claim 1, wherein:
the neighboring pixels represent ~~neighborhood of pixels is~~ one of a three-by-three square of pixels, a five-by-five square of pixels, and a seven-by-seven square of pixels.

18. (Currently Amended) The method of claim 17, wherein:
the pixel of interest ~~being considered~~ is located at a center of the neighborhood of pixels.

19. (Currently Amended) The method of claim 1, wherein:
the learning machine is a neural network;
the neural network includes hidden nodes and gating nodes; and
a gating node is associated with a corresponding hidden node, the gating node being configured to determine, based on a location of the pixel of interest ~~a pixel of being considered~~, a contribution the corresponding hidden node makes to an output of the neural network.

20. (Previously Presented) The method of claim 1, further comprising:

constructing from the identified pixels a boundary mask that indicates which pixels of the digital image are the identified pixels.

21. (Previously Presented) The method of claim 1, wherein decontaminating produces an opacity mask, the method further comprising:

constructing from the identified pixels a probability mask; and

combining the opacity mask and the probability mask.

22. (Previously Presented) The method of claim 21, wherein:

combining the opacity mask and the probability mask includes multiplying the opacity mask with the probability mask.

23. (Currently Amended) The method of claim 1, wherein the first region is a foreground of the digital image and the second region is a background of the digital image, and decontaminating includes:

excluding from the identified pixels a pixel that has no foreground colors; and

changing colors of a pixel that includes both foreground and background colors so that the changed identified pixels include only foreground colors.

24. (Currently Amended) A method for defining a boundary separating a first region and a second region of a digital image, the digital image including one or more color arrangements characteristic of a first visual texture of the first region and one or more color arrangements characteristic of a second visual texture of the second region, the method comprising:

receiving a user input providing a training set of pixels exhibiting sample color arrangements associated with the first and second visual textures;

training a neural network to classify learning machine input sets based upon the training set, using backward propagation, each learning machine input set including a pixel of interest and neighboring pixels and being derived from pixels in the digital image; and

determining based on an output of ~~a neural~~ the neural network which pixels of the digital

image satisfy criteria for classification as associated with the first region or the second region, by inputting learning machine input sets and a location of the pixel of interest and outputting an indication of a region to which each of the pixels of interest belong; and

~~determining based on an output of the neural network which pixels of the image satisfy criteria for classification as associated with the second region;~~

wherein the neural network includes a gating node associated with a corresponding hidden node, the gating node being configured to determine, based on a location of the pixel of interest ~~a pixel being considered~~, a contribution the corresponding hidden node makes to ~~an output~~ the output of the neural network.

25. (Cancelled)

26. (Currently Amended) The method of claim 24, wherein ~~claim 25, wherein:~~ the neighboring pixels represent ~~neighborhood of pixels is~~ one of a three-by-three square of pixels, a five-by-five square of pixels, and a seven-by-seven square of pixels, ~~pixels; and~~ the pixel of interest being ~~considered is~~ located at ~~the center~~ a center of the square of pixels.

27. (Currently Amended) The method of claim 24, further comprising:

training the gating node to determine, based on the location of the pixel of interest ~~being considered~~, a contribution the hidden node makes to the output ~~an output~~ of the neural network.

28. (Currently Amended) The method of claim 27, further comprising:

training the hidden nodes to classify pixels of the digital image as either associated with the first region or associated with the second region, wherein the training of the hidden nodes occurs during the training of the gating nodes.

29. (Currently Amended) The method of claim 24, ~~wherein the neural network includes: input nodes configured to receive~~ further comprising:

receiving input information specifying the location of the pixel being considered using input nodes; and ~~and to provide~~

providing the input information to the gating node.

30. (Currently Amended) The method of claim 24, ~~wherein the neural network includes: input nodes configured to receive~~ further comprising:

receiving input information specifying the color arrangement of the corresponding neighborhood of pixels via input nodes; and ~~and to provide~~

providing the input information to the corresponding hidden node.

31. (Currently Amended) A computer program product, tangibly stored on ~~machine~~ a computer-readable medium, for segmenting a first region and a second region of a digital image, the digital image ~~each region~~ including one or more color arrangements ~~that are~~ characteristic of a first visual texture of the first region and one or more color arrangements characteristic of a second visual texture of the second region, the product comprising instructions operable to cause a processor to:

receive a user input providing a training set of pixels exhibiting sample color arrangements associated with the first and second visual textures;

train a learning machine to classify learning machine input sets based upon the training set, each learning machine input set including a pixel of interest and neighboring pixels and being derived from pixels of the digital image;

determine using the trained learning machine ~~based on one or more of the color arrangements~~ which pixels of the digital image satisfy criteria for classification as being associated with the first region or the second region, by inputting learning machine input sets and outputting an indication of a region to which each of the pixels of interest belong;

~~determine based on one or more of the color arrangements which pixels of the image satisfy criteria for classification as associated with the second region;~~

identify pixels of the digital image that are determined not to satisfy the criteria for classification as being located either in the first region or the second region; and

decontaminate the identified pixels to define the boundary between the first and second regions by separating pixels of the digital image into pixels associated with the first region, the second region, or the boundary.

32. (Currently Amended) A computer program product, tangibly stored on ~~machine~~ a computer-readable medium, for segmenting a first region and a second region of a digital image, the digital image ~~each region~~ including one or more color arrangements ~~that are~~ characteristic of a first visual texture of the first region and one or more color arrangements characteristic of a second visual texture of the second region ~~the region~~, the product comprising instructions operable to cause a processor to:

receive a user input providing a training set of pixels exhibiting sample color arrangements associated with the first and second visual textures;

train a neural network to classify learning machine input sets based upon the training set, using backward propagation, each learning machine input set including a pixel of interest and neighboring pixels and being derived from pixels of the digital image; and

~~receive an input that selects a portion of the first region and an input that selects a portion of the second region;~~

determine based upon an output of the neural network which pixels of the digital image satisfy criteria for classification as association with ~~identify pixels, based on the inputs and the color arrangements of the first and second regions, located in~~ the first region or ~~; and identify pixels, based on the inputs and the color arrangements of the first and second regions, located in~~ the second region by inputting learning machine input sets and a location of the pixel of interest and outputting an indication of a region to which each of the pixels of interest belong;

wherein the neural network includes a gating node associated with a corresponding hidden node, the gating node being configured to determine, based on a location of the pixel of interest, a contribution the corresponding hidden node makes to the output of the neural network.